The purpose of this study was to analyze female liver transplant recipients reported to the National Transplantation Pregnancy Registry (NTPR) who became pregnant ≥5 years post-transplant with their first post-transplant pregnancy. Data were collected via questionnaires, phone interviews, and medical records. There are 156 liver recipients enrolled in the NTPR, and of these 49 recipients had a transplant-to-conception interval ≥5 years. There were 49 pregnancies with 50 outcomes (includes twins) reported. The mean age at first transplant was 18.3 ± 6.1 yrs., with a range of 1.9–32.0 yrs. Mean transplant-to-conception interval was 8.95 ± 3.7 yrs., with a range of 5.0–18.8 yrs. There were 39 livebirths, 8 spontaneous abortions, 1 therapeutic abortion, 2 stillbirths and no ectopic pregnancies. Immunosuppression during the 49 pregnancies was cyclosporine-based in 25 (13 Sandimmun®, 11 Neoral®, 1 Gengraf®), tacrolimus (Prograf®)-based in 22, and no immunosuppression in 2. Mycophenolate mofetil (MMF) was used as adjunctive therapy in 2 pregnancies. Comorbid conditions during pregnancy included: 32% hypertension, 8% diabetes, 19% infection, 25% preeclampsia and 6% rejection. The mean gestational age of the liveborn was 37.2 ± 2.5 wks; 42% were premature (<37 wks). The mean birthweight was 2,715 ± 656 g; 39% were low birthweight (<2500 g). Two birth defects included: hypoplasias (maternal immunosuppression Sandimmun®-based) and total anomalous pulmonary venous return (maternal immunosuppression included Neoral® and MMF). At last follow-up (mean 5.98 ± 4.2 yrs.) all children were reported healthy and developing well. At last follow-up (mean 6.5 ± 4.6 yrs.), maternal graft function was reported adequate in 39 (80%) recipients, 2 (4%) had reduced/poor function, 5 (10%) recipients had died, and 3 (6%) were lost to follow-up. Conclusions: Successful pregnancy outcomes have been reported in female liver recipients ≥5 years post-transplant. Long-term graft survival should be discussed with recipients as a component of preconception counseling. All transplant centers are encouraged to report pregnancies to the NTPR.

### Maternal Graft Function
- Graft function at last follow-up (n=49)
  - adequate n=39 (80%)
  - reduced/poor function n=2 (4%)
  - recipient death n=5 (10%)
  - lost to follow-up n=3 (6%)

### Maternal Conditions During Pregnancy
- Hypertension: 22%
- Infection: 19%
- Preeclampsia: 25%
- Diabetes: 8%
- Rejection: 6%

### Newborn Outcomes
- n = 39
- Mean gestational age 37.2 ± 2.5 wks
- Premature (<37 wks) 42%
- Mean birthweight 2,715 ± 656 g
- Low birthweight (<2500 g) 39%

### Structural Birth Defects
- At last follow-up, thirty-nine children were reported healthy and developing well with a mean age of 5.98 ± 4.2 yrs.
- The total number of liveborn with birth defects among the offspring was 2 of 39 children for an incidence of 5.1%.
- Birth defects included:
  - hypoplasias (n=1)
  - total anomalous pulmonary venous return (n=1)

The NTPR is supported by grants from: Novartis Pharmaceuticals Corp., Astellas Pharma US Inc., Genentech Inc., Pfizer Inc., Teva Pharmaceuticals USA, and Sandoz Inc.

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### Abstract
The purpose of this study was to analyze female liver transplant recipients reported to the National Transplantation Pregnancy Registry (NTPR) who became pregnant 25 years post-transplant with their first post-transplant pregnancy. Data were collected via questionnaires, phone interviews, and medical records. There are 156 liver recipients enrolled in the NTPR, and of these 49 recipients had a transplant-to-conception interval ≥5 years. There were 49 pregnancies with 50 outcomes (includes twins) reported. The mean age at first transplant was 18.3 ± 6.1 yrs., with a range of 1.9–32.0 yrs. Mean transplant-to-conception interval was 8.95 ± 3.7 yrs., with a range of 5.0–18.8 yrs. There were 39 livebirths, 8 spontaneous abortions, 1 therapeutic abortion, 2 stillbirths and no ectopic pregnancies. Immunosuppression during the 49 pregnancies was cyclosporine-based in 25 (13 Sandimmun®, 11 Neoral®, 1 Gengraf®), tacrolimus (Prograf®)-based in 22, and no immunosuppression in 2. Mycophenolate mofetil (MMF) was used as adjunctive therapy in 2 pregnancies. Comorbid conditions during pregnancy included: 32% hypertension, 8% diabetes, 19% infection, 25% preeclampsia and 6% rejection. The mean gestational age of the liveborn was 37.2 ± 2.5 wks; 42% were premature (<37 wks). The mean birthweight was 2,715 ± 656 g; 39% were low birthweight (<2500 g). Two birth defects included: hypoplasias (maternal immunosuppression Sandimmun®-based) and total anomalous pulmonary venous return (maternal immunosuppression included Neoral® and MMF). At last follow-up (mean 5.98 ± 4.2 yrs.) all children were reported healthy and developing well. At last follow-up (mean 6.5 ± 4.6 yrs.), maternal graft function was reported adequate in 39 (80%) recipients, 2 (4%) had reduced/poor function, 5 (10%) recipients had died, and 3 (6%) were lost to follow-up. Conclusions: Successful pregnancy outcomes have been reported in female liver recipients ≥5 years post-transplant. Long-term graft survival should be discussed with recipients as a component of preconception counseling. All transplant centers are encouraged to report pregnancies to the NTPR.

### Methods
Data were collected via questionnaires, phone interviews and medical records.

### Purpose
The purpose of this study was to analyze female liver transplant recipients reported to the National Transplantation Pregnancy Registry (NTPR) who became pregnant ≥5 years post-transplant with their first post-transplant pregnancy.

### Results
- 156 liver recipients reported 271 pregnancies to the NTPR
- Of these recipients, 49 had a transplant-to-conception interval of ≥ 5 years
- There were 49 pregnancies with 50 outcomes (including one set of twins)
- Mean age at first transplant was 18.3 ± 6.1 yrs. - range 1.9 – 32.0 yrs.
- Mean transplant-to-conception interval 8.95 ± 3.7 yrs. - range 5.0 – 18.8 yrs.

### Structural Birth Defects
- Birth defects included:
  - hypospadias (n=1)
  - total anomalous pulmonary venous return (n=1)

### Maternal Immunosuppression During 49 Pregnancies
- Cyclosporine based n=25
  - Sandimmun® n=13
  - Neoral® n=11
  - Gengraf® n=1
- Tacrolimus (Prograf®) based n=22
- No immunosuppression n=2
- Mycophenolate mofetil (MMF) was used as adjunctive therapy in 2 pregnancies

### Pregnancy Outcomes*
- Livebirths 39
- Spontaneous abortions 8
- Therapeutic abortions 1
- Stillbirths 2
- Ectopic pregnancies 0
- Total Outcomes 50

*Includes one set of twins

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### Maternal Conditions During Pregnancy

<table>
<thead>
<tr>
<th>Condition</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>22%</td>
</tr>
<tr>
<td>Infection</td>
<td>19%</td>
</tr>
<tr>
<td>Preeclampsia</td>
<td>25%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>8%</td>
</tr>
<tr>
<td>Rejection</td>
<td>6%</td>
</tr>
</tbody>
</table>

### Total Outcomes
- Livebirths: 39
- Spontaneous abortions: 8
- Therapeutic abortions: 1
- Stillbirths: 2
- Ectopic pregnancies: 0
- Total Outcomes: 50

To contact the NTPR and report additional pregnancies:
Thomas Jefferson University
1225 W. Washington Blvd, West College Building, Philadelphia, PA 19107, USA
Phone: Toll-free 877-955-6877; 215-955-4820; fax 215-923-1420
Email: NTPR.Registry@jefferson.edu
Website: http://www.jefferson.edu/ntpr

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